such genera as Doliolum and Salpa, and the Larvacea, containing the Appendicularia.

By far the greater number of the pelagic Tunicata collected during the voyage of the *Challenger* belonged to the genus Salpa. Of these, vast numbers were taken at the various stations, so that a great deal of labour was spent in a critical examination of these before it could be determined that they were all the same or different species.

The collection of pelagic Tunicata contained about twenty-six species, of which nine are new to science. No new genera are established, but a new family, the Octacnemidæ, has been formed for the reception of the remarkable deep-sea genus described by Moseley as Octacnemus.

Prof. Herdman gives in some detail, at the close of his account of the species and of their geographical and bathymetrical distribution, the conclusions at which, after a prolonged study of this group, he has arrived, as to their relationship and phylogeny; this is accompanied by a graphic representation of the phylogeny of the Tunicata. This important Report is illustrated by eleven plates.

THE BRITISH FARMER AND HIS COMPETITORS.

The British Farmer and his Competitors. By W. E. Bear. (London: Cassell and Co., Limited, 1888.)

THIS small volume of 160 pages is in some respects a reprint of articles published in the *Quarterly Review*, revised and brought down to date. The first chapter is devoted to the condition of British agriculture, in which the somewhat Radical doctrines of the Farmers' Alliance (an organization which has never succeeded in winning the confidence of the farmers) are promulgated. "Before this country will be cultivated to the best advantage, those who cultivate it must be either the owners of their farms, or tenants who are entitled to sell their improvements to the highest bidder, and who are free to crop the land as they please, provided that they be liable for actual damage done to the property of the owner." "Our farmers must have complete security for their capital invested in improvements, and freedom of enterprise as well, if they are to do the best they can with the land." This is the panacea for agricultural distress, and yet we may well ask why it is that Britain is exceptionally well cultivated, and that farmers as a rule farm as well or better than landlords? Landlord farming has, in fact, for the most part not been satisfactory, either when carried out on the large or on the small scale, and whether any advantage would accrue from its extension is exceedingly doubtful. Allotments, too, are put forward as amongst the requirements of our time, and small farming is also advocated, although condemned by experience.

Mr. Bear is more happy as a statistician than as a politician, and his chapters upon foreign competition and the prospects of the wheat-grower, and the breeder and feeder of live stock, are deeply interesting. The first welcome truth is that in almost all articles of agricultural production the crisis of injurious foreign competition appears to have been passed about the year 1883 or earlier. Such was the case up to date, with regard to wheat, barley, oats, and cattle. The maximum importation of sheep, hops, and potatoes, took place in 1882; of bacon, hams, and preserved meats in 1880; of pigs and cheese in 1878; and of beans in 1877. It must be understood that quantities in quarters and hundredweights, and not values, are indicated; and so considerable has been the shrinkage that the present imports of meat fall short of the maximum reached some eight years ago by about one million hundredweights, chiefly bacon.

Taken in connection with this diminution of foreign supplies of grain and meat, is to be noted the increase in population, not only at home and in Europe, but throughout our colonies and in the United States. In the last-named country alone, population has increased from 38,500,000 in 1870 to 62,500,000 at the beginning of the present year, and it is estimated that it will have reached 66,000,000 by 1890. During the five years ending with 1884 the average annual consumption of wheat in the United States was nearly 324,000,000 bushels, and the average export was 140,000,000 bushels. If the production in the five years ending with 1894 does not become greater, all but 43,000,000 bushels, or less than 5,500,000 quarters, will be required for home consumption, and the surplus will not suffice for the increased population of the next five years. Thus, unless the area of wheat-growing is greatly extended, the United States must cease to be a wheat-exporting country before the close of the present century! There is certainly a somewhat large "if" to swallow in accepting this statement, but it seems pretty evident that wheat-growing is not profitable at present prices, and that American farmers are becoming tired of it. Higher prices can alone cause the necessary increased supply, and the influence of such higher prices would be found in Europe to the advantage of the farmers. Considerable space is devoted to show that American and Canadian farmers grow wheat at a direct loss. It appears that the average gross money return from an acre of wheat in the United States is £1 13*s*. This figure is based on official information, and is arrived at by a yield of 12·2 bushels per acre, and a price of 68·1 cents. the bushel. As, however, the farmers have been often obliged to sell at 48 cents. per bushel, and the yield is in one State, not 12·2 but, 5 bushels, and in another 7 bushels, and in eight States it is below 8 bushels, the gross value of an acre of wheat must in many cases fall much below the average. It is held that unless 20 to 25 bushels can be secured no profit is possible. The cost of growing an acre of wheat in the States cannot, it appears, be placed under 14·11 dollars per acre, *i.e.* about or near £2 18*s*.; and if these figures are even approximately correct, the wheat-growers of the Far West must be in a worse plight than our own. Although nominally rent free, the Western farmers have generally been obliged to mortgage their farms at an interest of from 8 to 10 per cent. per annum, and according to one authority, "teams, tools, stock, and grain, all are being rapidly mortgaged." It is generally admitted that the American farmer's life as a rule is one of "excessive and almost incessant toil, and the scantiest reward—in money, at any rate; while his wife is held up in America as a common object of pity." With such encouragement, Mr. Bear does not expect wheat-growing to spread in America unless prices generally rise.

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The second part of the book is devoted to our meat supply and dairy produce. The greatest scare among home meat-producers has been occasioned by the increasing imports of frozen meat—chiefly mutton. The future of this trade is, however, very dubious, and exportation completely collapsed when prices fell in 1886 and 1887. A New Zealand colonist, writing to the *Otago Witness*, says:—"The producer, when he sends his meat to London, realizes about 4½*d.*, perhaps only 4*d.*, per pound; and when he deducts expenses, say 2½*d.*, he has only about 1½*d.* per pound for the choice of his flock. Now, this will not pay him, and some of our largest exporters of meat have decided that it will not pay them to send home their meat."

Mr. Bear's views on the future of English farming are, on the whole, hopeful, but he is accused by some of his critics of being an optimist. He has also brought down the wrath of the Canadian Press upon him for decrying the climate of Manitoba as a wheat-growing area, and discounting the reports of its fertility. As published under the auspices of the Cobden Club, the bias of the work is in favour of free trade, if we may except the trade in live stock, where contagious diseases are involved. Some political or economical bias ought to be accepted as inseparable from a book so issued. The reader will no doubt exercise judicious discrimination in accepting all the deductions, but will not fail to see that Mr. Bear's arguments are well supported by facts and official figures. The book is, in fact, a valuable contribution towards the solution of a question of vast importance—the future of our agriculture.

COLEOPTERA.

Biologia Centrali-Americana—Zoology: Coleoptera. Vol. I. Part II. By David Sharp, M.B., F.Z.S., &c. (London: R. H. Porter, 1882–87.)

ALTHOUGH nearly six years have been required for the completion of this volume, entomology has received a valuable contribution, which is at the same time an evidence of the untiring industry of its author and of the great liberality and enterprise of its editors. The volume covers about 840 pages, illustrated by nineteen plates, including in its scope nine divisions of the Coleoptera, called families, as follows: Haliplidæ, Dytiscidæ, Gyrinidæ, Hydrophilidæ, Heteroceridæ, Cyathoceridæ, Parnidæ, Georissidæ, and Staphylinidæ, in dealing with three of which Dr. Sharp had already shown a rare combination of analytical power and synthetic skill.

While the arrangement of the families in the order indicated above might be criticized as somewhat unnatural, it is to be presumed that the convenient division of labour among the different authors, and the approximation of the labours of each in one volume, had more to do with the sequence than the desire to indicate affinities.

The family *Haliplidæ* presents no point worthy of special mention; there are three new species in a total of six.

The *Dytiscidæ* is represented by 168 species, of which about seventy-one are new, nearly all small species, while the thorough analytical study previously given to the family by Dr. Sharp has left but one generic division to be indicated.

The *Gyrinidæ*, represented by twenty species, of which four are new, presents nothing of note, except the evident tendency of Gyretes to replace Gyrinus in the warmer parts of America.

The *Hydrophilidæ* contains 141 species, four-fifths of them new, requiring the indication of thirteen new genera. In the study of this family, Dr. Sharp gives evidence of the close attention he has devoted to it from the commencement of his career as an author, and he has shown how much new work may be done even in those families moderately well studied. The point seems well taken that the Hydrophilidæ constitute a family, and not a complex equivalent to the Adephaga. While no new arrangement of the family is proposed, the inaccuracy of our present method is shown, and numerous structural differences are indicated, which may form the basis of a better system when more is known of the genera from other regions than Europe and North America.

The next four families, Heteroceridæ, Parnidæ, Georissidæ, and Cyathoceridæ are all of small extent, containing between them but fifty species. While these are closely related among themselves, their position in mass between the Hydrophilidæ and Staphylinidæ is unnatural, and obscures their evident relationship with the Byrrhidæ and certain Dascyllidæ.

The greater portion of the volume is occupied with the treatment of the Staphylinidæ, in which more than 1400 species are enumerated, seven-eighths of them new; of the remaining eighth a fair proportion had already been described by Dr. Sharp elsewhere. The mere numerical statement will give but an inadequate idea of the labour expended in this part of the volume. Those who have had occasion to deal with the Aleocharinæ will realize the amount of minute examination required, almost ruinous in its effects on the eyesight. It is evident that the Staphylinide fauna of Mexico is far from being exhausted, and had as enthusiastic collectors as Mr. G. C. Champion collected in other parts as he did in his regions, it is safe to believe that the number of species would have been more than doubled. In a notice like the present it seems unnecessary to enter more deeply into details. Although much has been done in Staphylinidæ, our knowledge of the fauna of Europe is the only one approximately complete, and it gives a very narrow basis for comparison.

As a whole, Dr. Sharp's work will receive the recognition due to careful, conscientious, and erudite labour. It is to be regretted that the descriptions are at times too brief; and how much difficulty future students may find in following them may be inferred from the experience of Dr. Sharp with the longer and very able descriptions of Erichson.

The volume concludes with nineteen plates, with about 450 figures, which will prove useful in the identification of the species. The omission of details is to be regretted, although their representation would have given Dr. Sharp an amount of labour which he could hardly be expected to undertake.

G. H. H.

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